CLAIMS

1. A method for the preparation of an optical (bio)chemical sensor device, said device comprising a substrate material having a planar surface portion, said planar surface representing a transducer based on an optical phenomenon; said planar surface portion having arranged thereon a plurality of (bio)chemical sensor dots located at spatially separated predetermined positions of the planar surface, said sensor dots including

(i) a polymer matrix, and
(ii) one or more (bio)chemical recognition moieties,

the method comprising

(a) providing a substrate material having a planar surface portion;
(b) providing one or more spotting fluid(s) each comprising at least one of
    (i) a polymer and/or polymer precursor; and
    (ii) a component representing one or more (bio)chemical recognition moieties;
(c) depositing either simultaneously or sequentially the one or more spotting fluid(s) at the spatially separated predetermined positions of the planar surface portion of the substrate material by means of a "pin-ring" deposition mechanism and allowing the spotting fluid(s) to consolidate.

2. A method according to claim 1, wherein the optical phenomenon is selected from transmission, fluorescence, and surface plasmon resonance.

3. A method according to claim 2, wherein the optical phenomenon is surface plasmon resonance.

4. A method according to claim 1, wherein the substrate material comprises a base material selected from glasses, silica, dielectric inorganic materials, plastics, and silicon with a hydrogen- or deuterium-terminated surface.

5. A method according to claim 1, wherein the substrate material comprises a planer surface portion consisting of at least one surface layer material selected from metals and silicon.

6. A method according to claim 5, wherein the surface layer material has a thickness of 10-500 nm.

7. A method according to the claim 1, wherein the planar surface of the substrate material is chemically modified by treatment with a bifunctional reagent:

X-Z-Y

wherein X is selected from -OR', asymmetric or symmetric disulfides (-SSR'Y', -SSRY), sulfides (-SR'Y', -SRY), diselenide (-SeSeR'Y', -SeSeRY), selenide (-SeR'Y', -SeR'Y'), thiol (-SH), selenol (-SeH), -N≡C, $-NO_2$, trivalent phosphorous groups, -NCS, -OC(S)SH, thiocarbamate, phosphine, thio acid (-COSH), dithio acid (-CSSH), $-Si(OR/R/H)_3$ and halogen,

each of the substituents R and R' independently are selected from optionally substituted C_{1-30}-alkyl, optionally substituted C_{2-30}-alkenyl, optionally substituted C_{2-30}-alkynyl; and optionally substituted aryl,

Y and Y' are selected from hydroxyl, carboxyl, amino, formyl, hydrazine, carbonyl, epoxy, vinyl, allyl, acryl, epoxy, and methacryl, and

Z is a linker (biradical) between the two functional groups.

8. A method according to claim 1, wherein at least one of the one or more spotting fluid(s) comprises a polymer selected from polyacrylates, polyanilines, poly(butadiene), polyethylene, poly(ethylene-co-vinyl acetate), polymethacrylates, polystyrenes, polypyrroles, polythiophenes, polyurethanes, poly(vinyl acetate), poly(vinyl alcohol), poly(vinyl chloride), epoxy novolac resins, and co- or terpolymers of the before-mentioned polymers.

9. A method according to claim 1, wherein at least one of the one or more spotting fluid(s) comprises a polymer precursors selected from monomeric acrylates, monomeric methacrylates, oligomers and crosslinkers.

10. A method according to claim 1, wherein at least one of the one or more spotting fluid(s) comprises a plasticizer.

11. A method according to claim 8, wherein at least one of the one or more spotting fluid(s) comprises a plasticizer.

12. A method according to claim 9, wherein at least one of the one or more spotting fluid(s) comprises a plasticizer.

13. A method according to claim 8, wherein the spotting fluid comprises a polymerization initiator.

14. A method according to claim 9, wherein the spotting fluid comprises a polymerization initiator.

15. A method according to claim 1, wherein the (bio)chemical recognition moieties are selected from ionophores, chromoionophores, and complex lipophilic inorganic ions.

16. A method according to claim 1, wherein the spotting fluid(s) are allowed to consolidate upon exposure to heat, irradiation with ultraviolet light, irradiation with visible light, or by means of electron induced excitation.

17. A method according to claim 1, wherein two or more spotting fluids are sequentially deposited at each predetermined position of the planar surface, and wherein the spotting fluids are allowed to consolidate after the last deposition of a spotting fluid.

18. A method according to claim 1, wherein two or more spotting fluids are sequentially deposited at each predetermined position of the planar surface, and wherein the spotting fluids are allowed to consolidate after deposition of each of the spotting fluids.

19. A method according to claim 1, wherein each of the (bio)chemical sensor dots comprises different (bio)chemical recognition moieties.

20. A method according to claim 19, wherein the sensor device comprises at least 5 different sensor dots.

21. A method according to claim 1, wherein optical phenomenon is surface plasmon resonance, and the substrate material is prepared from a plastic base material and a metal surface layer material, the sensor dots being prepared from a polyvinylchloride or cross-linked acrylate comprising a plasticizer.

22. A method according to claim 21, wherein the metal is gold and the base material is polyetherimide.

23. A (bio)chemical sensor device obtainable by the method of claim1.

24. A (bio)chemical sensor device according to claim 23, wherein each of the (bio)chemical sensor dots comprises different (bio)chemical recognition moieties.

25. A method according to claim 24, wherein the sensor device comprises at least 5 different sensor dots.

26. A method for monitoring and/or characterizing two or more analytes, wherein an optical (bio)chemical sensor device according to claims 21 is used.

27. A method according to claim 26, wherein a surface plasmon resonance technique is utilized in combination with the optical (bio)chemical sensor device.